

REMARKS/ARGUMENTS

Claims 1-18 and 20-42 are currently pending in this application. Claims 21 and 37 have been amended herein to more clearly identify the claimed subject matter.

Claims 11 and 36 have been rejected under 35 U.S.C. § 112, first paragraph. Claims 1-2, 7-10, 12, 14, 21-25, 27-35 and 37 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,988,971 to Fossey ("Fossey"). Claims 5-6 and 41-42 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossey. Claims 3-4 and 39-40 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossey in view of U.S. Patent No. 6,024,393 to Shamlou et al. ("Shamlou"). Claims 11, 13, 15-16 and 36 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossey in view of U.S. Patent No. 6,454,332 to Govzman et al. ("Govzman"). Claims 17-18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossey in view of U.S. Patent No. 6,164,894 to Cheng ("Cheng"). Claim 38 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossey in view of U.S. Patent No. 6,040,585 to Hsiao ("Hsiao").

Applicant's Claimed Invention

Applicant's invention is directed to a system for handling substrates, such as semiconductor wafers, held in a carrier, the system including an end effector attached to a moveable end of a robotic arm. The end effector includes a blade having a first end and a second end, and an active area configured to measure a distance between the substrate and a critical plane defined by the first and second end. A passive gripper is attached to the first end of the blade and an active gripper attached to the second end of the blade for gripping the substrate. The end effector further includes a mapping sensor disposed on the

articulated robotic arm, the mapping sensor configured to measure to the position and orientation of the substrate within the carrier.

Independent claim 1 recites, among other things, a mapping sensor configured to measure the position and orientation of the substrate within the carrier and an active area configured to measure a distance between the substrate and the critical plane. Independent claim 29 recites, among other things, a mapping sensor configured to measure the position and orientation of the substrate and an active area for sensing a distance between the substrate located along the blade and the critical plane. Independent claim 21 recites, among other things, a mapping sensor that measures coordinate information of the substrates in the carrier and a substrate sensor that measures a distance between the substrate and the critical plane. Independent claim 23 recites, among other things, a mapping sensor that records mean vertical substrate locations and a substrate sensor that measures a distance between the substrate and the critical plane.

Response to Rejections

The Examiner has rejected claims 11 and 36 under 35 U.S.C. § 112, first paragraph. In particular, the Examiner asserts that pneumatic sensors do not sense distance between two objects if there is no “blockage.” Applicant respectfully traverses the rejection under 35 U.S.C. § 112, first paragraph, because a pneumatic sensor as claimed measures a distance between the recited substrate and the critical plane when such distance exists, and is further capable of determining when there is no such distance between the substrate and the critical plane. The claim language requires nothing further. For these reasons, Applicant respectfully requests that the Examiner withdraw the rejection under 35 U.S.C. § 112, first paragraph.

The Examiner has rejected independent claims 1, 21, 23 and 29 under 35 U.S.C. § 102(b) as being anticipated by Fossey. Anticipation under 35 U.S.C. § 102 requires each and every limitation of the claim to be disclosed in a single prior art reference, either expressly or inherently. The anticipating reference must disclose the elements in the arrangement called for by the claim. If any limitation of the claim is missing, the reference does not anticipate.

Independent claims 1, 21, 23 and 29 are patentable over Fossey because this reference, either alone or in combination with the other references cited by the Examiner in the office action, does not show or suggest a mapping sensor as recited in the claims.

The Examiner asserts that Fossey discloses a “mapping sensor” shown as 61 in the drawings of Fossey. In column 6, lines 15-20, item 61 is described as, “a pair of downwardly-looking capacitance sensors 61 mounted in the lowermost edge of the paddle 21” Fossey further describes sensor 61 as follows (column 8, lines 58-61):

The downward looking sensors 61 on paddle 21 sense the presence of the reference target 55 and thus confirm that the robot is at the proper position opposite the wafer cassette. The paddle 21 is then moved in the y-axis toward the front of the machine and across the top of the cassette, which allows the downward looking sensors 61 to scan each slot location, sensing the presence or absence of the wafer’s upper edge at each slot.

Fossey further describes the use of capacitive sensors in the summary of the invention at column 1, lines 59-61, in that “[c]apacitive sensors are cost effective and reliable, and their compact size allows them to be easily accommodated in confined spaces.” The sensors 61 disclosed in Fossey sense the presence or absence of an object including the wafer.

The present invention utilizes an active area or a substrate sensor to measure the distance between the substrate and a critical plane defined by the first and second end of the end effector. The present invention *additionally* includes a mapping sensor configured to measure to the position and orientation of the substrate within the carrier. As disclosed in page 11, line 24 through page 12, line 12 of the specification, the mapping sensor provides

the capability for mapping the location of the substrates positioned within input cassettes.

Output is obtained from the mapping sensor, e.g., at 1 millisecond intervals, which provides a number of advantages, including providing thickness measurements of all substrates within the cassettes.

The mapping sensor as claimed in independent claims 1, 21, 23 and 29, is distinct from the claimed active area and substrate sensor, and as such is not disclosed in Fossey, which only discloses one of these types of sensors. Therefore, independent claims 1, 21, 23 and 29 are patentable over Fossey, either alone or in combination with the other references cited in the office action.

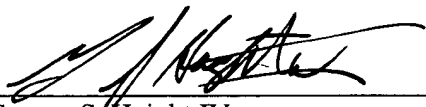
Dependent claims 2-18, 20, 22, 24-28 and 30-42 depend directly or indirectly from independent claims 1, 21, 23 and 29, and thus contain all of the limitations of the independent claims from which they depend. Therefore, these dependent claims are patentable over Fossey and the other cited references, either alone or in combination, for at least the reasons set forth above with respect to claims 1, 21, 23 and 29.

Applicant submits that all of the claims are now in condition for allowance, which action is requested. Please apply any charges or credits to Deposit Account No. 50-1721.

Respectfully submitted,

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